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PHYTOTOXICOLOGY ASSESSMENT SURVEYS CONDUCTED IN THE VICINITY OF HANDY & HARMON LTD. 290 CARLINGVIEW DRIVE, TORONTO, (Etobicoke) 1982 through 1985

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E. PICHÉ, Director
Air Resources Branch

Phytotoxicology Assessment Surveys Conducted in the Vicinity of Handy & Harmon Ltd. 290 Carlingview Drive, Toronto, (Etobicoke) 1982 through 1985

ARB No: ARB-141-87-Phyto
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Authors: R. Emerson, R. Rinne

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Air Resources Branch
Phytotoxicology Section
880 Bay Street, Suite 347
Toronto, Ontario
M5S 1Z8

Report Abstract

Comparisons of the 1983 and 1985 surface soil results with the corresponding pre-operational (1982) results suggested that H&H operations may be a minor source of Cd emissions. However, the H&H operations have not had any appreciable effect on soil levels of the other metals (Cu, Pb, Zn, Hg, Ni and Ag) tested.

RÉSUMÉ

On a comparé les résultats des analyses du sol menées en 1983 et 1985 avec les résultats correspondants de 1982, soit avant l'entrée en service de l'usine H&H. Il apparaît que l'usine est peut-être une source mineure de rejets de cadmium dans l'environnement. Elle n'a cependant pas d'effet sensible sur les concentrations dans le sol des autres métaux recherchés (Cu, Pb, Zn, Hg, Ni et Ag).

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Introduction & Methods

A pre-operational soil collection survey was conducted in the area of Handy and Harmon Ltd. (H&H) on May 21, 1982 at the request of Mr. T. Armstrong, MOE, Central Region. Precious metal refining operations by the company commenced shortly afterwards. The sampling program consisted of nine stations with soil at sites close to the company and more remote being sampled (see attached map). The soil sampling program was repeated in September 1983 and again in September 1985, with the same sites being sampled in all years. Surface soil (0-5 cm) was collected each year as well as subsoil (5-10 cm) in 1983 and 1985. The surveys were performed to determine the status of metal emissions from the company.

All soil samples collected each year were analyzed on a dry weight basis for cadmium (Cd), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni), silver (Ag) and zinc (Zn) by the Laboratory Services Branch, MOE.

Analytical Results

I. Surface Soil (0-5 cm) Results

The metal results for surface soil are shown in the attached Table as are respective "upper limit of normal" guidelines for urban soil which have been established by the Phytotoxicology Section.

Cadmium

Since H&H commenced operations in 1982, cadmium levels only at soil collection Site 5 to the neighbouring east of the company have been slightly increasing suggesting that H&H operations possibly are an emitter of this element. However, on the basis that even the highest Cd levels which were detected at Site 5 in 1983 (0.6 ppm) and 1985 (0.8 ppm) were well below the respective "upper limit of normal" guideline for urban soil (4 ppm), it would appear that H&H emissions are a minor source of Cd (Table 1).

Copper, Lead, Zinc

The Cu, Pb and Zn results (Table 1) show that the soil levels detected more recently (in 1985) at Sites 1,3,4 and 5 closest to the company are similar to the respective pre-operational (1982) levels. Therefore, the company also does not appear to be a significant emission source of these elements. In 1985, the highest Cu (42 ppm), Pb (79 ppm) and Zn (125 ppm) levels were detected at remote Site 9 and even these levels were low in comparison to the respective guidelines (100, 500, 500 ppm). Site 9 was close to Hwy. 427, and as vehicle emissions are a potential source of Cu, Pb and Zn, it is suspected that vehicle traffic was largely responsible for the increase in soil levels that have been detected at this site since 1982.

Mercury, Nickel, Silver

Levels of Hg, Ni, and Ag detected at all soil collection sites in recent years (1983 & 1985) were not found to be markedly different from the pre-operational (1982) results. Soil levels found in the survey area since 1982 have been well within a normal range in relation to the guidelines (Table 1a) further indicating that H&H operations are not a significant source of Hg, Ni and Ag emissions.

II. Subsoil (5-10 cm) Results

The subsoil metal results for both 1983 and 1985 generally were low and were within the same range as the corresponding surface soil levels. The subsoil results are not presented in the attached Tables but will be kept on file for comparative purposes should future sampling in the H&H survey area be requested.

Summary

Comparisons of the 1983 and 1985 surface soil results with the corresponding pre-operational (1982) results suggested that H&H operations may be a minor source of Cd emissions. However, the H&H operations have not had any appreciable effect on soil levels of the other metals (Cu, Pb, Zn, Hg, Ni and Ag) tested.

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Table 1
Metal Concentrations (ppm, dry wt.) Detected in Surface Soil (0-5 cm) Collected in the Vicinity of Handy & Harmon Ltd. Toronto - 1982, 1983, 1985

Site No.	Distance(m) & Direction from Handy & Harmon	Cadmium			Copper			Lead			Zinc		
		1982	1983	1985	1982	1983	1985	1982	1983	1985	1982	1983	1985
1	10 SW	<0.5	<0.2	<0.2	36	18	26	18	20	24	71	58	59
2	100 WSW	<0.5	0.5	<0.2	44	26	31	40	69	41	97	143	77
3	10 NW	<0.5	0.4	0.4	21	22	30	38	77	49	71	107	99
4	75 NE	<0.5	0.2	0.4	21	20	23	55	61	58	68	77	66
5	10 SE	<0.5	0.6	0.8	34	26	36	90	65	73	113	100	98
6	450 NE	<0.5	0.2	0.2	28	22	32	58	30	37	77	68	64
7	800 E	<0.5	<0.2	0.3	48	18	23	21	31	34	85	80	79
8	400 ESE	<0.5	<0.2	<0.2	31	19	29	19	23	28	80	76	79
9	500 W	<0.5	0.2	0.3	20	29	42	12	63	79	58	117	125
ULN*		4			100			500			500		

*"Upper Limit of Normal" Guidelines for Urban Soil (0-5 cm) Established by the Phytotoxicology Section.

Table 1a
Metal Concentrations (ppm, dry wt.) Detected in Surface Soil (0-5 cm) Collected in the Vicinity of Handy & Harmon Ltd. Toronto - 1982, 1983, 1985

Site No.	Distance(m) & Direction from Handy & Harmon	Mercury			Nickel			Silver		
		1982	1983	1985	1982	1983	1985	1982	1983	1985
1	10 SW	0.03	0.03	0.03	19	19	19	2	<0.2	<0.2
2	100 WSW	0.05	0.04	0.04	21	21	21	<1	<0.2	<0.2
3	10 NW	0.03	0.04	0.05	14	24	20	<1	<0.2	<0.2
4	75 NE	0.07	0.05	0.06	14	18	14	<1	<0.2	<0.2
5	10 SE	0.06	0.04	0.05	18	25	19	<1	<0.2	<0.2
6	450 NE	0.04	0.03	0.03	18	21	19	<1	<0.2	<0.2
7	800 E	0.05	0.04	0.04	21	25	20	<1	<0.2	<0.2
8	400 ESE	0.03	0.04	0.04	19	22	20	<1	<0.2	<0.2
9	500 W	0.04	0.05	0.06	12	22	19	<1	<0.2	<0.2
ULN*		0.5			60			25[a]		

*"Upper Limit of Normal" Guidelines for Urban Soil (0-5 cm) Established by the Phytotoxicology Section.

a - Clean-up guideline for decommissioning industrial property for residential/ parkland use.

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Map of vicinity of Handy and Harmon Ltd., 290 Carlingview Drive, Etobicoke, showing locations of soil sampling sites established May 21, 1982.